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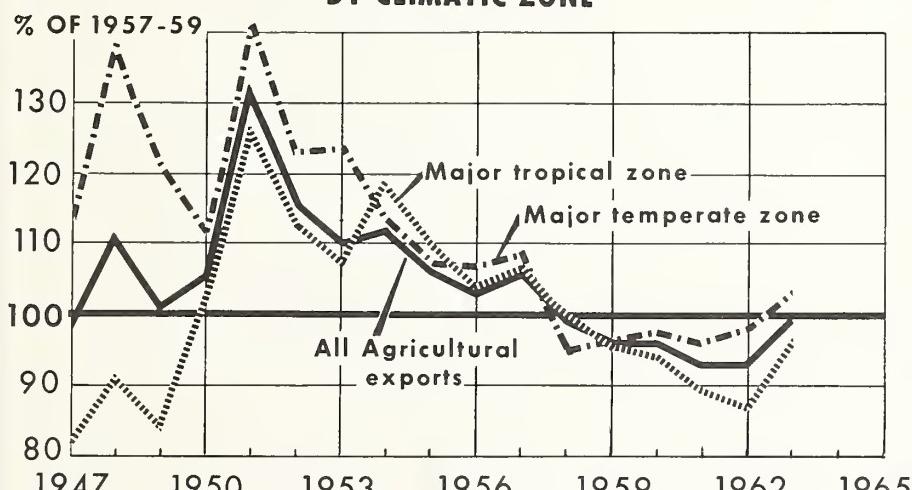
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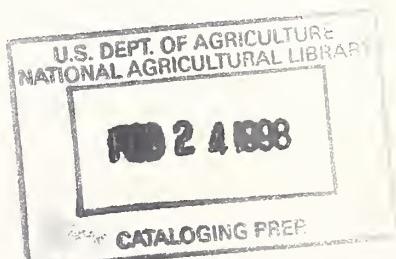
AGRICULTURAL EXPORTS

EXPORT PRICES OF MAJOR AGRICULTURAL COMMODITIES, BY CLIMATIC ZONE



from
Temperate
and
Tropical
Zones

CHANGES IN PRICES AND FOREIGN EXCHANGE EARNINGS, 1947-63





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SUMMARY

Prices of agricultural exports of the Free World have tended to decline and foreign exchange earnings have risen since World War II. But the magnitude of the changes has been different for different commodities. Over the postwar era from 1947 to 1963, prices of farm exports from the Temperate Zone dropped an average of 2 percent a year, while prices of major tropical products as a whole declined 0.2 percent a year. But the variation in prices of Tropical Zone products was almost twice as much as the variation in prices of Temperate Zone products.

Prices in 1947-54 were particularly unstable. Prices of tropical products increased approximately 50 percent from 1947 to 1951. In 1954, they were still over 40 percent higher than their 1947 levels. Prices of Temperate Zone products fluctuated within a rather wide range in 1947-54, but in 1954 they were lower than they had been in 1947.

From 1954 to 1963, prices of tropical products declined an average of 2.6 percent per year and those of Temperate Zone products declined 1.5 percent per year. The variation of prices was somewhat less in this period, although Tropical Zone prices again varied about twice as much as Temperate Zone prices.

Among the tropical products, price reductions in 1954-63 were greatest for coffee and cocoa, which accounted for nearly a third of the total foreign exchange earnings of the tropical commodities, and for tea and rubber, which accounted for 30 percent of the earnings.

Export earnings for both groups of commodities increased throughout the period studied. For the Tropical Zone commodities, the increase in earnings was 2.5 percent for the entire postwar period, but negligible over the last decade studied. Very significant declines in earnings for coffee and cocoa largely offset the increases for a number of other Tropical Zone commodities during this decade.

AGRICULTURAL EXPORTS FROM TEMPERATE AND TROPICAL ZONES

Changes in Prices and Foreign Exchange Earnings, 1947-63

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INTRODUCTION

Purpose of Study

Since World War II much emphasis has been given to the problems faced by the less developed nations. One of their primary problems has been the level and variability of prices and foreign exchange earnings received for their agricultural exports. These nations typically have been unable to earn enough foreign exchange to carry out their economic development programs. The programs include construction of harbors, highways, railroads, schools, drainage canals, hydroelectric dams, communication systems, and all the other items usually regarded as social overhead or as infrastructure. Construction of these items takes planning, whether they are constructed and owned by the central government or by private enterprise. Therefore, earnings need to be high, and the amount of foreign exchange that will become available in future years needs to be known with some certainty.

Most of the foreign exchange of the less developed nations is earned from exports of tropical agricultural products. Approximately a third of these nations earn over 80 percent of their foreign exchange from agricultural exports.¹ Due to supply and demand factors, prices for these exports have been declining and are relatively low. In addition, there is little diversity in the agricultural export sector. During 1959-62, 19 less developed areas earned 50 percent or more of their total foreign exchange from the export of only one commodity (appendix table 6). Since the prices of agricultural commodities fluctuate considerably, total export earnings of these nations have also fluctuated.

Prices of Temperate Zone agricultural commodities are also important to the less developed nations. Diets of a great many people in the less developed nations are insufficient. Agricultural products from the Temperate Zone are becoming an important source of food for these nations as rising populations and increased incomes create an additional need and demand for food. Before World War II, the less developed areas exported 11 million tons of grain per year to the developed nations. Since the war the flow has been reversed. The highly developed nations shipped the less developed nations 4 million tons annually in 1948-52; 15 million in 1957-60; 21 million in 1961; and (preliminary estimate) 25 million in 1964.² There are even some economists who believe the less developed nations will soon be net importers of primary products and net exporters of manufactures. It is argued that the real competitive advantage of temperate countries is in agriculture, since temperate climates are more favorable to the retention of soil fertility than tropical climates.³ In addition, cattle production is more difficult in the Tropics due to the presence of the tsetse fly in Africa and of foot-and-mouth disease in many less developed nations.

¹ United Nations Food and Agriculture Organization. Trade Yearbook. Vol. 17, table 1. Rome, 1964.

² Brown, Lester R. The Impact of Future World Supply and Demand Prospects on U.S. Agricultural Trade. An address at the Fifth Annual Farm Policy Review Conference, Washington, D.C., 1965.

³ Lewis, Arthur W. A Review of Economic Development. Amer. Econ. Rev., Vol. 55, No. 2, May 1965.

Because of the extreme importance of international agricultural trade to the less developed nations, this study was undertaken to measure the trends and fluctuations of prices and earnings for the major agricultural commodities entering world trade. This report compares the changes for the Temperate Zone commodities with those for the Tropical Zone commodities. It does not attempt to compare price changes of primary products with price changes of manufactured goods; that is, it does not analyze the terms of trade of the less developed nations. It is the purpose of this study to answer the question: In international trade, have prices and export earnings of the Tropical Zone commodities (those from the less developed nations) declined more than those from the Temperate Zone, or have they fluctuated more, or both? If they have declined and fluctuated more, to what extent have they done so?

As part of the effort to answer these questions, a measure of trend was developed for 2 time periods: The overall postwar period (1947-63), and the last decade of that period (1954-63). (Data for 1964 were not available when this study was made.) It was fairly obvious before the study that trends in prices for the overall postwar period would differ significantly from those for the last decade. Conclusions about one period probably would differ from those for the other period. Thus, it became a secondary purpose of this study to see how prices and earnings differed for the 2 time periods, for both Temperate and Tropical Zone commodities.

Selecting Commodities

Commodities chosen for study were those exported by the Free World in 1961 and having an estimated export value of more than \$200 million as derived from Food and Agriculture Organization of the United Nations (FAO) Trade Yearbook, Rome, Italy, Vol. 16, 1963.⁴ An exception to the \$200 million lower limit was made for palm oil. The edible oils as a group are a very significant agricultural export but no one oil had an estimated value over \$200 million. Palm oil was selected to represent the overall group since it had the largest value in 1961.⁵

On this basis, 29 commodities were designated as major agricultural exports of the Free World (table 1). A product was classified as a Temperate Zone commodity if it originated primarily in the highly developed nations of Western Europe, the United States, Canada, Australia, New Zealand, South Africa, and Japan. A product was classified as a Tropical Zone commodity if it originated primarily in the remaining nations of the Free World. This follows the classification often used by the United Nations and other international organizations, as a convenient way to refer to the commodities. A commodity is shown (1) in the Temperate Zone group if more than 65 percent, by volume, of the Free World exports of the commodity was shipped from the above designated countries; (2) in the Tropical Zone group, if more than 65 percent was shipped from less developed countries; and (3) as typical of both zones in the remaining cases. As indicated in table 1, the cutoff point could have been set as high as 90 percent, and most commodities would still have qualified for inclusion in either the Temperate or the Tropical Zone group. Three significant exceptions, however, are corn, wool, and rice.

Following the above procedure, 11 commodities were identified as Temperate Zone commodities, 11 as Tropical Zone commodities, and 7 as typical of both zones. Changes in prices and export earnings of the 7 commodities typical to both zones were not analyzed. The combined export value of the other 22 commodities averaged approximately \$14

⁴ The Free World is defined here to include Cuba since for a substantial part of the period studied it was a part of the Free World community. Exports from the USSR, Eastern Europe, and Mainland China are excluded.

⁵ In the 1964 edition of the Trade Yearbook (Vol. 17) there were revised 1961 figures for most commodities. For some commodities the 1961 estimate of total value fell below the \$200 million minimum and for powdered milk and jute, the 1959-62 average fell below this level. Nevertheless, the basis of selection has included all the major commodities entering world trade and no commodity included could be considered as less than a major commodity.

TABLE 1.--Free World agricultural exports from highly developed and less developed countries: Value, volume, and percentage, by major commodity, 1959-62 average

| Commodity | Free World exports | | Percentage of volume shipped | | |
|------------------------------------------|----------------------|----------------------|------------------------------|-------------------------------|-----------------------------|
| | Estimated value | Volume | Total | By highly developed countries | By less developed countries |
| <u>Temperate Zone Commodities</u> | | | | | |
| | Million U.S. dollars | Thousand metric tons | Percent | Percent | Percent |
| Wheat..... | 1,882 | 29,150 | 100 | 91 | 9 |
| Wheat flour..... | 311 | 3,908 | 100 | 96 | 4 |
| Barley..... | 303 | 5,755 | 100 | 89 | 11 |
| Corn..... | 626 | 12,761 | 100 | 71 | 29 |
| Bacon, ham, salted pork..... | 256 | 378 | 100 | 100 | 0 |
| Powdered milk..... | 164 | 441 | 100 | 100 | 0 |
| Butter..... | 422 | 526 | 100 | 95 | 5 |
| Cheese..... | 334 | 464 | 100 | 99 | 1 |
| Eggs (in the shell).... | 215 | 396 | 100 | 86 | 14 |
| Soybeans..... | 356 | 4,001 | 100 | 98 | 2 |
| Wool ¹ | 1,600 | 1,369 | 100 | 82 | 18 |
| Total or average..... | 6,469 | --- | 100 | ² 88 | ² 12 |
| <u>Tropical Zone Commodities</u> | | | | | |
| | | | | | |
| Rice (milled)..... | 617 | 5,347 | 100 | 22 | 78 |
| Bananas..... | 311 | 3,787 | 100 | 4 | 96 |
| Copra..... | 240 | 1,451 | 100 | 0 | 100 |
| Peanuts (shelled).... | 215 | 1,216 | 100 | 7 | 93 |
| Palm oil..... | 110 | 543 | 100 | 4 | 96 |
| Coffee..... | 1,889 | 2,682 | 100 | 2 | 98 |
| Tea..... | 614 | 528 | 100 | 5 | 95 |
| Cocoa..... | 508 | 925 | 100 | 2 | 98 |
| Sugar (raw)..... | 1,244 | 12,049 | 100 | 11 | 89 |
| Rubber (natural).... | 1,545 | 2,519 | 100 | 4 | 96 |
| Jute..... | 192 | 891 | 100 | 2 | 98 |
| Total or average..... | 7,485 | --- | 100 | ² 6 | ² 94 |
| <u>Commodities typical of both zones</u> | | | | | |
| Live cattle..... | 401 | ³ 3,072 | 100 | 62 | 38 |
| Beef and veal..... | 577 | 1,023 | 100 | 60 | 40 |
| Oranges and tangerines | 318 | 2,782 | 100 | 60 | 40 |
| Wine..... | 437 | ⁴ 22,920 | 100 | 42 | 58 |
| Cotton..... | 1,883 | 3,158 | 100 | 41 | 59 |
| Tobacco..... | 843 | 691 | 100 | 50 | 50 |
| Oilseed cake and meal. | 319 | 4,737 | 100 | 40 | 60 |
| Total or average | 4,778 | --- | 100 | ² 48 | ² 52 |
| Total, 29 commodities..... | 18,732 | --- | --- | --- | --- |

¹ Greasy and degreased. ² Weighted by estimated value. ³ Thousand head. ⁴ Thousand hectoliters.

billion annually, or close to 50 percent of the average annual value of all agricultural goods shipped by the Free World during 1959-62.

Although agricultural exports of the Soviet Bloc (except Cuba) are excluded from the statistics presented here, the following tabulation indicates the relative importance of Soviet Bloc exports to world trade. No data were available on exports from Mainland China.

Percentage of world trade, by volume, originating in
Soviet Bloc nations, 1959-62 average

| Country and commodity | Percent |
|------------------------------|---------|
| USSR: | |
| Wheat | 15.2 |
| Butter..... | 9.8 |
| Eastern Europe: | |
| Bacon, ham, salted pork..... | 5.4 |
| Eggs..... | 20.5 |

The percentages for all the other commodities in this study were under 5 percent.

Basic Statistical Data Used

Published and unpublished FAO data were used throughout this study. The time series data used for prices were taken from the FAO publication, "The State of Food and Agriculture" (1963 and 1964 editions, annex tables 16 and 16A, respectively).

Specifically, these data are the world average unit values, in current U.S. dollars, per metric ton of exports. Unit values differ from prices in that unit values are the total value (exported) of all grades of a particular commodity divided by the total quantity. Prices specify, either directly or indirectly, the grade of the commodity, the type of packaging or container, the place of sale, and the basic terms of the transaction. Prices usually fluctuate more than unit values but both measures show the same trend.

The data on unit values are based on a sample. Unit values of the major trading nations in each of several regions are collected and averaged. These nations usually represent 70 percent or more of the total exports of their respective regions. The world average is a weighted average of the regional averages.

The time series data used for export earnings were estimated values of Free World exports in millions of current U.S. dollars. The sources of these data are unpublished FAO records. The data are estimated by multiplying (1) the total volume exported by all free nations by (2) the weighted average unit values of the main trading countries.

The value of a particular agricultural export is for most commodities synonymous with export earnings. However, the United States has shipped great quantities of food and fiber under various foreign aid programs since the end of World War II. From the end of the War in Europe to June 1964, the United States provided approximately \$25.7 billion of agricultural commodities on a concessional basis to the rest of the world. This accounts for an overwhelming proportion of food aid shipped by all nations during this period.⁶ Only a small part of the value of these shipments represents export earnings. This is particularly true during the recovery period (1946-50) and during the Korean War years,

⁶ Barlow, Frank D., and Libbin, Susan A. The Role of Agricultural Commodity Assistance in International Aid Programs. U.S. Dept. Agr., ERS-Foreign 118, 1965.

1951-53. Since the adoption of Public Law 480 in 1954 a certain proportion of concessional sales can rightly be considered as export earnings.⁷ However, because exact information has not been developed on this problem, no adjustment has been made in the export value data in this report. The extent to which this is a problem is discussed under the analysis of the trends of export earnings.

Analytical Measures Used

The regression coefficient b in the equation for a straight line, $Y = a + bX$, was used to measure trends of both unit values and export earnings. This value was determined by the least-squares method and represents the annual change in prices, or export earnings, over a 10- or 17-year period on a straight-line basis. A diagram of the trends of prices and export earnings of corn, soybeans, coffee, and cocoa is shown in figure 1. In many cases, a nonlinear equation would have been a better description of the trend of a series. However, for the sake of comparability, a straight-line trend was used throughout.

Another step was taken to increase the degree of comparability. The average (arithmetic mean) price of butter per metric ton during the 10-year period 1954-63 was \$831; for corn it was \$54. Because of the large difference in magnitude of the basic data, a regression coefficient of -\$19.82 for butter could not be compared directly with a coefficient of -\$1.42 for corn even though a straight-line function was used in both cases. Therefore, all coefficients have been expressed as a percentage of the average price (or average export earnings) during the 10-year or 17-year period. On a noncumulative basis a regression coefficient of -\$19.82 for butter equaled a 2.4 percent annual decline during the decade 1954-63 while a coefficient of -\$1.42 for corn was 2.6 percent of the average price during this period.

Fluctuations of prices and earnings around the trend line were measured in terms of the average of absolute differences between (1) the observed values of prices or earnings (Y_i) and (2) the corresponding values calculated by means of the equation of the various trend lines (Y_c). In mathematical terms this is expressed as:

$$\frac{\sum | Y_i - Y_c |}{n}$$

The parallel vertical lines indicate that all values are considered positive, and n equals the number of years, either 10 or 17 in this case. This measure bears the same relationship to a trend line as an average deviation does to an arithmetic mean. It is referred to in this paper as the average deviation from the trend or the degree of fluctuation.

As with the regression coefficient, it was difficult to compare the average deviations from the trend of the various commodities with each other in the original form. Therefore, each deviation was also expressed as a percentage of the average price for a given period.

POSTWAR CHANGES IN UNIT VALUES

Trend analysis

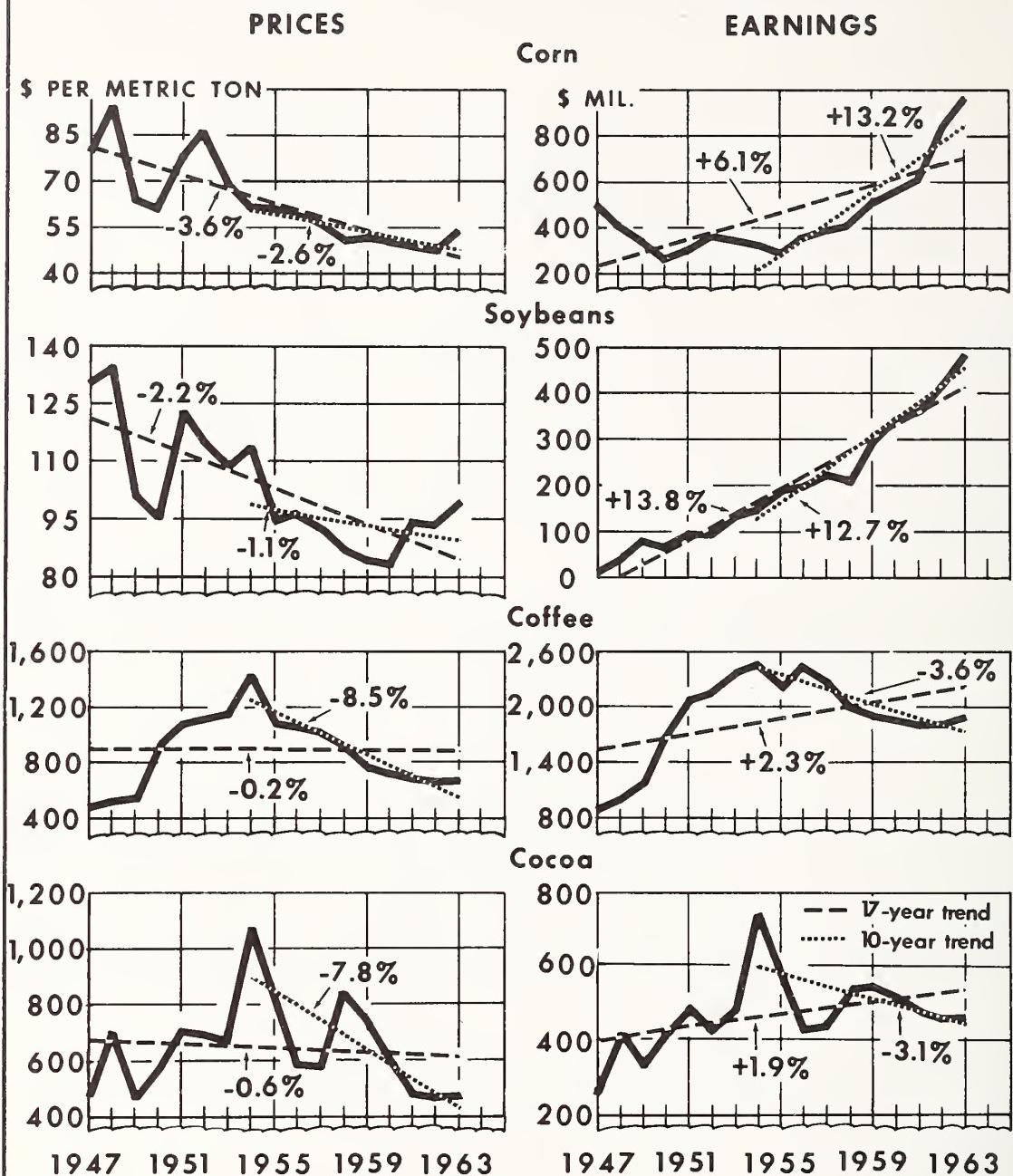
Statistical measures developed to record the trends of unit values for each of the 22 major commodities are shown in table 2. Weighted averages were also computed for each climatic zone. These averages are used as indicators of the general trend of unit values of commodities from each area.

In addition, an average unit value (price) index was calculated for the Temperate Zone commodities as one unit and for the Tropical Zone commodities as a unit. These

⁷ Elrod, Warrick E. Monetary Effects of Financing Agricultural Exports. U.S. Dept. Agr., Foreign Agr. Econ. Rpt. 12, 1963.

TRENDS IN WORLD EXPORT PRICES AND EARNINGS

Selected Commodities



BASIC DATA FAO, STATE OF FOOD AND AGRICULTURE, 1963 AND 1964.

U. S. DEPARTMENT OF AGRICULTURE

NEG. ERS 3953-65 (9) ECONOMIC RESEARCH SERVICE

Figure 1

TABLE 2.--Changes in unit values of Free World agricultural exports, major commodities, 1954-63 and 1947-63¹

| Commodity | Annual change (b) ² | | Annual change as a percent of average unit value | |
|-------------------------------------|--------------------------------|----------------------------|--------------------------------------------------|----------------------------|
| | 10-year trend (1954-63) | 17-year trend (1947-63) | 10-year trend (1954-63) | 17-year trend (1947-63) |
| <u>Temperate Zone Commodities</u> | | <u>U.S. dollars</u> | | <u>Percent</u> |
| Wheat..... | -0.22 | -1.96 | -0.3 | -2.7 |
| Wheat flour..... | -2.16 | -3.46 | -2.6 | -3.6 |
| Barley..... | -.04 | -2.35 | -.1 | -3.7 |
| Corn..... | -1.42 | -2.23 | -2.6 | -3.6 |
| Bacon, ham, salted pork..... | .96 | -.10 | .1 | (³) |
| Powdered milk..... | -9.18 | -12.80 | -2.5 | -3.1 |
| Butter..... | -19.82 | -15.04 | -2.4 | -1.7 |
| Cheese..... | 4.70 | 2.66 | .7 | .4 |
| Eggs (in the shell)..... | -7.28 | -9.27 | -1.2 | -1.5 |
| Soybeans..... | -1.06 | -2.25 | -1.1 | -2.2 |
| Wool (greasy)..... | -37.86 | -8.60 | -2.9 | -.6 |
| Weighted average ⁴ | --- | --- | -1.5 | -2.0 |
| <u>Tropical Zone Commodities</u> | | | | |
| Rice (milled)..... | -2.04 | -3.19 | -1.7 | -2.4 |
| Bananas..... | -2.24 | -1.11 | -2.4 | -1.2 |
| Copra..... | -.04 | -3.14 | (³) | -1.8 |
| Peanuts (shelled)..... | -3.98 | -1.56 | -2.2 | -.8 |
| Palm oil..... | -1.02 | -3.41 | -.5 | -1.6 |
| Coffee..... | -76.18 | -1.82 | -8.5 | -.2 |
| Tea..... | -20.62 | 8.62 | -1.7 | .7 |
| Cocoa..... | -51.40 | -3.93 | -7.8 | -.6 |
| Sugar (raw)..... | 4.14 | 1.08 | 3.9 | 1.0 |
| Rubber (natural)..... | -6.00 | 3.04 | -1.0 | .5 |
| Jute..... | 6.34 | -5.68 | 3.0 | -2.4 |
| Weighted average ⁴ | --- | --- | -2.6 | -.2 |

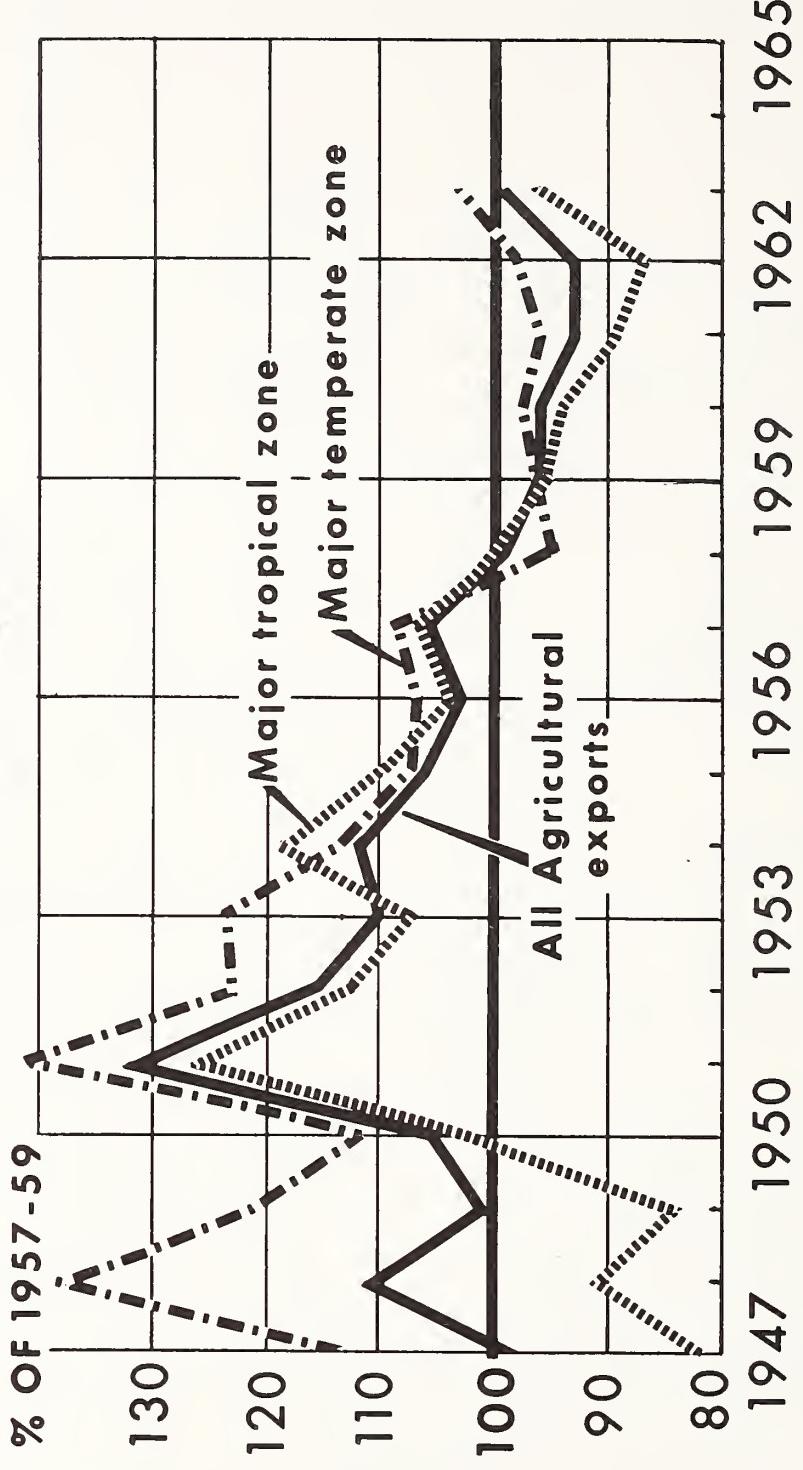
¹ Original data are world average unit values per metric ton. ² Data represent the regression coefficient, i.e., the slope of the line in the equation $Y = a + bX$.

³ Between .05 and -.05 percent. ⁴ Weighted by estimated average value, 1959-62.

two indexes were then plotted along with the overall unit value index shown in The State of Food and Agriculture, 1963. (See fig. 2.)

To obtain a weighted aggregate index, a definite quantity of each commodity was taken for 1947-56, and another quantity for 1957-63. Calculations were then made to determine what the aggregate of commodities was worth in each year at current prices. By this procedure, changes in total value of the commodities were due only to changes in prices

EXPORT PRICES OF MAJOR AGRICULTURAL COMMODITIES, BY CLIMATIC ZONE



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Figure 2

since the quantity remained constant during each period. For 1947-56, the indexes were based on the average volume of exports for 1952-53. To reflect the changing importance of commodities, the index for 1957-63 was based on average volume for 1957-59. Each index was then expressed in terms of 1957-59 = 100.

All general conclusions drawn from an analysis of the data in table 2 regarding the climatic zones as a whole are consistent with the changes reflected in the unit value indexes shown in figure 2. Table 2, in addition, analyzes the changes associated with the various individual commodities.

Over the entire postwar period the unit values of sugar, tea, and rubber showed an upward trend although in no case was the regression coefficient very large. The trend was downward for the remaining 8 tropical commodities. The downward trends were greatest for rice and jute, while for coffee there was practically no change on a trend basis. (Fluctuations around the trend line for coffee were great. These are discussed later.) The net result of all these changes is that the export unit values of the major tropical commodities, as a group, showed only a very slight long-term decline in the postwar period.

Data for the Temperate Zone indicate quite a different situation. Overall, the long-run export values declined about 2.0 percent annually. For wheat flour, barley, corn, and powdered milk, they declined by more than 3 percent annually. The less developed nations were assisted to some extent by the declines, since these nations do import some of the commodities. Only the unit value for cheese showed a slight upward trend in the long run.

The figures reflect another difference between the Temperate and Tropical Zones. For the Temperate Zone commodities during the overall period the trend was -2.0 percent; for the last 10 years it was -1.5 percent, not a radical difference. On the other hand, for the Tropical Zone a considerable difference occurred in the data for the 2 periods; the long-run postwar trend showed only a very slight decline while the trend for the last 10 years was sharply downward, averaging 2.6 percent annually. For the less developed nations the decline in export prices was much greater over the last 10 years than for the entire postwar period. In contrast, in the more recent period export prices rose slightly for the highly developed nations.

For the less developed nations the deterioration was caused to a large extent by the extreme decline in coffee and cocoa prices (-8.5 percent and -7.8 percent respectively). During recent years these 2 commodities accounted for approximately 32 percent of the foreign exchange earnings of the 11 major tropical exports. For tea and rubber, which account for nearly 30 percent of the foreign exchange earnings, the regression coefficient over the last 10 years was also negative while over the entire period it was positive. Then too, the degree of decline for bananas and peanuts was greater in recent years than in the overall postwar period.

Conversely, the situation in the more recent period was an improvement over that for the entire period for rice, copra, palm oil, jute, and sugar.

Sugar presents a unique situation and a statistical problem. From 1947 to 1962 the average unit value of sugar oscillated between roughly \$90 and \$120 per metric ton and the trend was rather flat. In 1963, however, the average unit value jumped to \$168 per metric ton. A regression coefficient is greatly influenced by an extreme value at either end of the horizontal axis, that is, for this study, at either end of the time period. Thus the coefficient for sugar is exaggerated. Since sugar accounts for over 16 percent of the foreign exchange earnings of these commodities (including shipments from Cuba) the overall decline for the less developed nations is somewhat understated. By excluding the 1963 average unit value for sugar from the calculations, an overall average decline for the less developed nations of 3.2 percent instead of 2.6 percent is obtained for 1954-63. Preliminary data for 1964 indicate that sugar prices declined from the high 1963 levels but were still above their normal level.

Fluctuation analysis

The statistical measures developed to record fluctuations are shown in table 3. The general significance of the figures is that the larger the figure the larger the variation or fluctuation of the unit values around the respective trend lines.

While the trend data show that in the long run the Tropical Zone commodities have fared better in the postwar period than the Temperate Zone commodities, the situation is quite the reverse when it comes to stability of unit values. In the long run, the unit

TABLE 3.--Deviations from trends in unit values of Free World agricultural exports, major commodities, 1954-63 and 1947-63¹

| Commodity | Average deviation from-- | | Average deviation as percentage of average price | |
|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------------------------|-------------------------------|
| | 10-year trend (1954-63) | 17-year trend (1947-63) | 10-year trend (1954-63) | 17-year trend (1947-63) |
| <u>Temperate Zone Commodities</u> | | <u>U.S. dollars</u> | | <u>Percent</u> |
| Wheat..... | 1.64 | 5.61 | 2.6 | 7.8 |
| Wheat flour..... | 4.10 | 6.87 | 4.9 | 7.1 |
| Barley..... | 2.17 | 8.19 | 4.1 | 13.1 |
| Corn..... | 2.42 | 5.70 | 4.5 | 9.1 |
| Bacon, ham, salted pork..... | 19.37 | 33.32 | 2.8 | 4.9 |
| Powdered milk..... | 21.30 | 36.92 | 5.7 | 8.8 |
| Butter..... | 68.32 | 80.61 | 8.2 | 9.1 |
| Cheese..... | 26.30 | 38.34 | 3.8 | 5.6 |
| Eggs (in the shell)..... | 30.25 | 38.83 | 5.1 | 6.1 |
| Soybeans..... | 6.33 | 9.18 | 6.8 | 9.0 |
| Wool (greasy)..... | 108.86 | 254.47 | 8.5 | 18.9 |
| Weighted average ² | --- | --- | 5.2 | 10.8 |
| <u>Tropical Zone Commodities</u> | | | | |
| Rice (milled)..... | 8.29 | 13.50 | 7.1 | 10.2 |
| Bananas..... | 3.96 | 4.43 | 4.3 | 4.6 |
| Copra..... | 15.73 | 21.45 | 9.8 | 12.4 |
| Peanuts (shelled)..... | 8.15 | 16.61 | 4.5 | 8.8 |
| Palm oil..... | 8.77 | 21.75 | 4.4 | 10.1 |
| Coffee..... | 63.92 | 223.57 | 7.2 | 25.7 |
| Tea..... | 34.18 | 83.28 | 2.8 | 7.1 |
| Cocoa..... | 98.33 | 127.84 | 14.9 | 20.0 |
| Sugar (raw)..... | 14.12 | 11.36 | 13.2 | 10.7 |
| Rubber (natural)..... | 78.14 | 130.82 | 13.4 | 22.5 |
| Jute..... | 20.59 | 38.78 | 9.8 | 16.3 |
| Weighted average ² | --- | --- | 9.5 | 17.1 |

¹ Original data are world average unit values per metric ton.

² Weighted by estimated average annual value, 1959-62.

values of commodities from the less developed nations fluctuated nearly 60 percent more as a group than those from the highly developed nations, and in the last 10 years they fluctuated over 80 percent more. In the Tropical Zone, unit values of coffee, cocoa, rubber, and jute all showed exceedingly large fluctuation over the past 17 years; variations for rice, copra, palm oil, and sugar also were fairly high. In the Temperate Zone, the unit value for wool showed a very high degree of fluctuation, with the unit value for barley also showing a fairly high degree.

However, in both zones, fluctuation decreased for 1954-63. Over the long run (1947-63), the variation of the Temperate Zone commodities as a group was 10.8 percent; but in the past 10 years the corresponding figure was only 5.2 percent. For the Tropical Zone, the variation dropped from 17.1 percent to 9.5 percent. These changes are roughly equivalent to a 50 percent decline. On an individual basis significant declines occurred in variations for wheat, barley, corn, wool, peanuts, palm oil, coffee, tea, rubber, and jute. In contrast, the variations for butter, eggs, and bananas showed no significant change while those for rice, copra, and cocoa declined somewhat but remained fairly high.

Sugar unit values, on the other hand, fluctuated more during the shorter, more recent period. This increase in fluctuation was due to (1) a short supply and high prices in 1963 and 1964, caused partly by drought in Europe and partly by a labor shortage in Cuba; and (2) high valuation reported for Cuban barter trade with the Soviet Bloc.

The variations for a number of commodities over the 17-year period were due in part to the disruptive forces of World War II and the Korean conflict. Data indicating lesser fluctuations for 1954-63 bear this out. Wars, however, are only part of the answer. Prices for a number of Tropical Zone products during 1963 increased sharply, reversing the recent trend for many of these products. War cannot account for these changes.

Finally, the degree of fluctuation of the world average export unit value may not reflect the full variation of a particular country's export earnings, for at least two reasons. First, a particular nation may have a small crop due to adverse weather in the same year that world market prices are low, or it may have a large crop when prices are high. Second, the fluctuation of the prices for various species within a commodity grouping may be greater than the fluctuation for the group as a whole. For example, there are two primary species of coffee--arabic and robusta. Available evidence indicates that in recent years prices for robusta coffee fluctuated more than those for arabic coffee.

On the other hand, export earnings may not fluctuate (or decline) as much as prices, the difference being compensated by a change in volume. Changes in prices, if no change in volume occurs, will bring about a change in export earnings. These earnings, in turn, add to the development of a nation. Thus, it is of interest to see how foreign exchange earnings from the export of major agricultural products have changed since World War II.

POSTWAR CHANGES IN EXPORT EARNINGS

Some agricultural exports by the United States have been for the purpose of aid and have not led directly or in effect to foreign exchange earnings. Aid in the form of shipments of food and fiber can be viewed in two ways. First, the viewpoint can be taken that, in effect, the commodities are sold to the recipient country and then the United States returns the receipts of the sale to the foreign nation as a gift. Under present arrangements the manner in which the receipts are returned takes various and complex forms and in fact not all of the receipts are effectively returned as a gift; to the extent that they are not, the transaction is a sale.

The second view is that, in effect, the commodities, or at least part of them, are simply shipped to the foreign nation as a gift.

In either case the aid or gift portion of the shipments probably has taken the place of some dollar loans or grants and has thereby indirectly helped the United States in its

balance-of-payments position. Nevertheless, it is improper to consider the value of the aid portion of these shipments as foreign exchange earnings.

An adjustment to the estimated value of Free World exports of the 22 commodities in this study should be made so that only bona fide export earnings are included. Unfortunately, there are not sufficient detailed statistics to carry out this adjustment for individual commodities, especially in the earlier years. Until 1949, there was no detailed classification by commodity of agricultural exports under Government programs. From 1949 through 1955, the classification is by broad groupings such as bread grains, coarse grains, or dairy products.

In 1954, most of the food aid program was placed under the Agricultural Trade and Development Assistance Act of 1954 (Public Law 480) which is administered by the U.S. Department of Agriculture (USDA). Since 1955, calendar year data on a detailed commodity basis are available so that a comparison is possible between the value of food shipped as U.S. aid and the export value of total Free World shipments. For 1956-63, very little bacon, ham, or salted pork, eggs (in the shell), or wool was shipped on a concessional basis. For the remaining eight Temperate Zone commodities and one tropical product, rice, the proportions are as follows:

Percentage of world exports, by value, shipped as food aid by
the United States, selected commodities, 1956-1963

| Commodity | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 |
|--------------------|------|------|------|------|------|------|------|------|
| -----Percent----- | | | | | | | | |
| Wheat | 34 | 33 | 30 | 32 | 37 | 33 | 31 | 32 |
| Wheat flour..... | 6 | 16 | 24 | 30 | 40 | 46 | 42 | 45 |
| Barley..... | 16 | 9 | 9 | 11 | 22 | 17 | 7 | 1 |
| Corn..... | 26 | 26 | 15 | 11 | 12 | 15 | 13 | 6 |
| Powered milk | 54 | 52 | 55 | 32 | 26 | 37 | 38 | 35 |
| Butter..... | 9 | 1 | 3 | 1 | (1) | (1) | 1 | 2 |
| Cheese | 17 | 18 | 14 | 1 | (1) | (1) | 1 | 2 |
| Soybeans..... | 4 | 4 | 7 | 9 | 2 | 1 | 2 | 1 |
| Rice..... | 17 | 12 | 8 | 8 | 15 | 8 | 13 | 13 |

¹ Zero or rounds to zero.

Of the remaining tropical commodities, only small amounts of peanuts and sugar have been shipped as food aid.

Even for 1956-63, it is impractical to adjust for the effects of food aid on foreign exchange earnings. Some of the foreign currencies received under P.L. 480 as payment for commodities may never be used by the United States. Such transactions take place for humanitarian or political reasons and not for commercial reasons. Then again, it might be known with a high degree of certainty that the local currencies received will be used but not until several years hence. Before that time, inflation in the recipient country may erode the value of the currency to only a fraction of its original value or purchasing power.⁸ In a commercial transaction, the receipts would have been converted from the

⁸ In the early years of P.L. 480 there was a guarantee against loss of value because of inflation through a maintenance-of-value clause in the formal agreement between the United States and the recipient country. This clause required that the foreign government make a supplemental deposit sufficient to compensate for any loss of value that may have occurred between the time of deposit and the time that the funds were used by the United States. This guarantee is no longer included. From an accounting viewpoint, it was difficult to administer and it often worked extreme hardships on foreign nations just when they needed assistance.

foreign currency into dollars or other stable currencies. In a P.L. 480 transaction this is impossible. Therefore, to the extent that the United States loses quid pro quo through inflation, the transaction is a gift. Because the size of the gift depends upon future events (inflation), it is impossible at the time of the transaction to determine the size of the gift.

To measure the size of the gift, a historical viewpoint could be taken. That is, one could determine in detail the P.L. 480 transactions that occurred in year 1, for example, and then ascertain to what extent the receipts in that year depreciated while they were being held in subsequent years. Receipts in year 2 could be studied in the same manner and so on for each successive year. This procedure is, in general, beside the point of this study. Thus the analysis of the trend and fluctuation of export earnings of temperate zone commodities, and of rice, is limited in that export earnings of these commodities are inflated by the value of commodities actually given as aid.

There is one other limitation to the analysis that follows. Although most less developed nations export only a few commodities, all of them export more than one. Therefore, the decline (increase) in earnings from one or several commodities may be offset by an increase (decline) from one or several other commodities. On the other hand, the changes of the various commodities may enhance or augment each other rather than offset one another.

What holds true for the trend analysis holds for the analysis of fluctuations.

Trend Analysis

The statistical measures developed to record the trend of export earnings are shown in table 4.

Over the entire postwar period export earnings by the major Temperate Zone commodities have increased on the average by about 3.4 percent annually; the corresponding figure for Tropical Zone commodities is 2.5 percent (fig. 3). Primarily responsible for the Temperate Zone increase was the enormous increase for soybeans (13.8 percent) and rather substantial increases for corn (6.1 percent) and bacon, ham, and salted pork (4.9 percent). Almost all soybeans are exported by the United States, very little of them under P.L. 480 programs. Also, practically no bacon, ham, or salted pork is shipped under U.S. Government programs. While a considerable proportion of corn was shipped under these programs, this proportion decreased during 1956-63.

The downward trend for wheat flour is by far the most significant of any commodity, temperate or tropical. This strongly downward trend is due to the very large shipments made by the United States during the postwar recovery period. During this period, the war-torn nations of Europe were unable to mill wheat into flour. So large were these shipments that the trend is still downward in spite of increased shipments under U.S. Government food aid programs in recent years.

Primarily responsible for the long-run increase for the tropical commodities were the increases for sugar, peanuts, bananas, and rubber (all over 3 percent). Peanuts showed the largest increase (3.4 percent) for any commodity other than sugar (3.9 percent). But the figure for sugar is somewhat overstated, for the statistical reasons discussed above. All of these increases, however, would have been largely nullified if the trend for coffee had been significantly smaller or negative since coffee plays such a large role in the foreign trade of the less developed nations.

Only the regression coefficients for copra and jute were negative. The increases for rice and palm oil were small.

For the more recent period, 1954-63, the overall figures for each zone are in sharp contrast. The annual increase for the Temperate Zone was 4.7 percent, which is an improvement over the longer period. In the Tropical Zone, the overall figure was 0.2 percent, a deterioration from the longer period. In short, there was practically no increase

TABLE 4---Changes in export earnings of Free World agricultural exports,
major commodities, 1954-63 and 1947-63

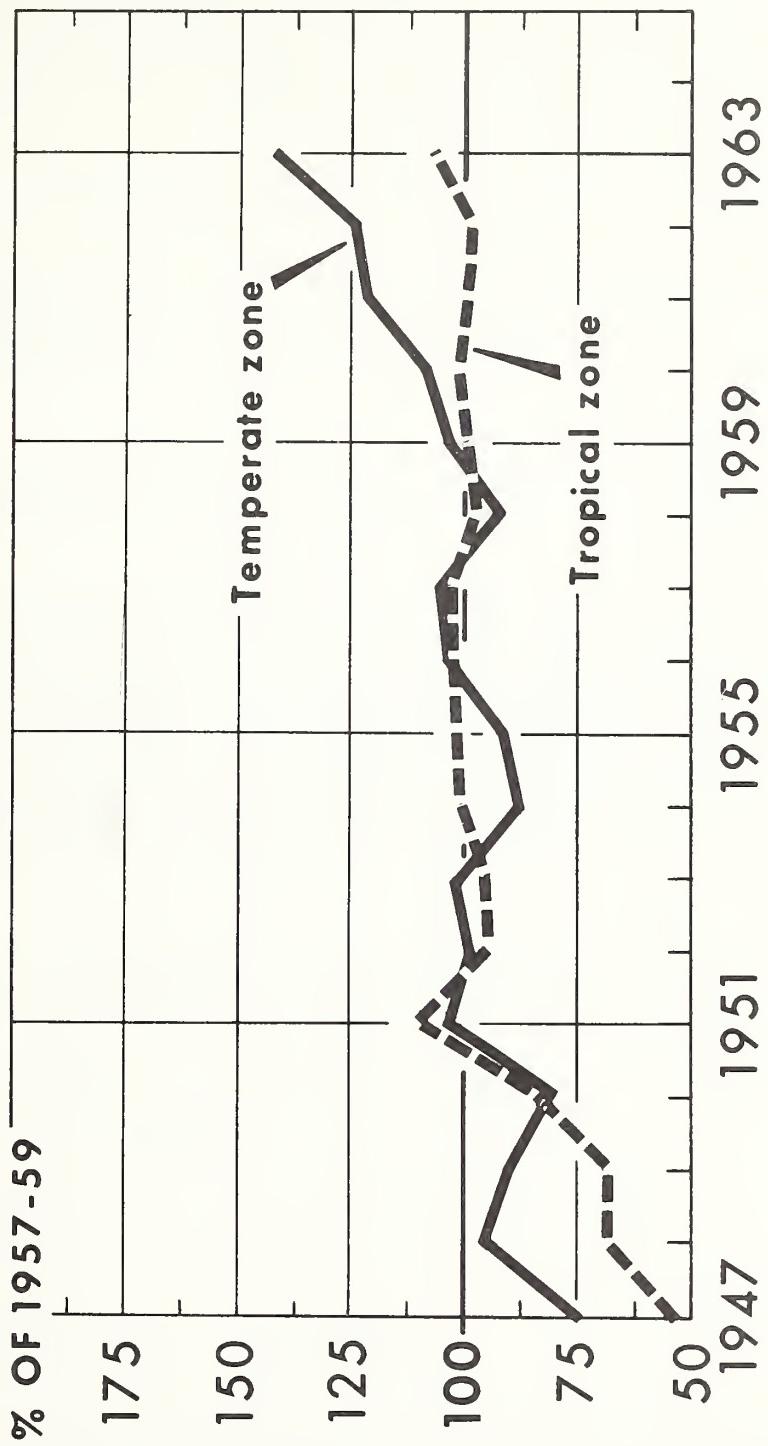
| Commodity | Annual change (b) ¹ | | Annual change as percentage of average earnings | |
|-------------------------------------|--------------------------------|-------------------------------|-------------------------------------------------------|-------------------------------|
| | 10-year trend (1954-63) | 17-year trend (1947-63) | 10-year trend (1954-63) | 17-year trend (1947-63) |
| <u>Temperate Zone Commodities</u> | | <u>Million U.S. dollars</u> | | <u>Percent</u> |
| Wheat..... | 123.4 | 38.4 | 7.1 | 2.3 |
| Wheat flour..... | .4 | -19.0 | .1 | -5.1 |
| Barley..... | 1.0 | 7.4 | .3 | 2.7 |
| Corn..... | 69.6 | 27.8 | 13.2 | 6.1 |
| Bacon, ham, salted pork..... | 7.2 | 10.0 | 3.0 | 4.9 |
| Powdered milk..... | 8.4 | 5.1 | 5.8 | 4.0 |
| Butter..... | -.4 | 2.6 | -.1 | .6 |
| Cheese..... | 14.6 | 10.8 | 4.8 | 4.0 |
| Eggs (in the shell)..... | -3.4 | 5.5 | -1.6 | 2.8 |
| Soybeans..... | 36.4 | 27.2 | 12.7 | 13.8 |
| Wool (greasy)..... | 8.8 | 22.9 | .6 | 1.7 |
| Weighted average ² | --- | --- | 4.7 | 3.4 |
| <u>Tropical Zone Commodities</u> | | | | |
| Rice (milled)..... | 4.8 | 3.3 | .8 | .5 |
| Bananas..... | 4.4 | 9.2 | 1.4 | 3.2 |
| Copra..... | .2 | -1.8 | .1 | -.7 |
| Peanuts (shelled)..... | 5.4 | 6.3 | 2.5 | 3.4 |
| Palm oil..... | -.8 | .9 | -.7 | .8 |
| Coffee..... | -75.4 | 43.6 | -3.6 | 2.3 |
| Tea..... | (³) | 16.0 | (³) | 2.9 |
| Cocoa..... | -16.4 | 8.8 | -3.1 | 1.9 |
| Sugar (raw)..... | 59.4 | 41.3 | 5.0 | 3.9 |
| Rubber (natural)..... | 15.4 | 33.7 | 1.3 | 3.0 |
| Jute..... | 4.0 | -1.0 | 2.2 | -.5 |
| Weighted average ² | --- | --- | .2 | 2.5 |

¹ Data represent the regression coefficient, i.e., the slope of the line in the equation $Y = a + bX$. ² Weighted by estimated average annual value, 1959-62. ³ Between .05 and -.05.

in export earnings for tropical commodities on an overall trend basis in the last 10 years for which data are available, even when current dollars are used as the basic data. The trend would surely be negative if adjusted for general price increases in the world market, or adjusted for rice shipments under U.S. aid programs, or for both.

The increase in export earnings for three Temperate Zone commodities primarily explain the overall increase for the highly developed nations. The commodities are wheat, corn, and soybeans. The rate of increase for wheat in the last 10 years (7.1 percent) was

EXPORT EARNINGS OF MAJOR AGRICULTURAL COMMODITIES, BY CLIMATIC ZONE



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Figure 3

more than triple the overall rate (2.3 percent). This increase has not been due to shipments under U.S. food aid programs. Wheat shipments under these programs remained very close to one-third of world shipments from 1956 to 1963. The rate of increase for corn (13.2 percent) was the largest of any commodity in the recent period and was double its long-run rate. Corn now accounts for approximately 10 percent of the foreign exchange earnings of the 11 Temperate Zone commodities in this study. The enormous increase in earnings from soybeans continued in 1954-63.

Export earnings for wheat flour, barley, butter, and wool leveled off during the recent period; only for eggs (in the shell) was there a significant decline.

For the Tropical Zone commodities, earnings from coffee and cocoa declined at a rate of over 3.0 percent a year. At the same time, there was a fairly substantial increase for sugar and a fair increase for peanuts and jute. Only for copra, sugar, and jute was the experience of the more recent period an improvement over the entire period.

Fluctuation Analysis

The statistical measures developed to record fluctuation of export earnings are shown in table 5. As in table 3, the general significance of the figures is that the larger the figures the larger the fluctuations around the trend line.

In analysis of price trends (table 2), price fluctuations (table 3), and trend of export earnings (table 4), it was discovered that the changes related to Temperate Zone commodities were quite different from those of the tropical commodities in one way or another. With regard to fluctuation of export earnings, table 5 indicates that there was hardly any difference between the experience of the two areas. For the 17-year period, the average deviation as a percentage of average earnings for that period was approximately 15 percent for each zone. The corresponding figure for 1954-63 period was about 8 percent. Not only were the averages for each zone nearly the same, the various extremes of the individual commodity averages were almost equal to each other, as shown in the following tabulation:

Greatest and smallest fluctuation in export earnings of major agricultural exports, by period and zone

| Period and zone | Greatest fluctuation | Smallest fluctuation |
|-------------------|----------------------|----------------------|
| -----Percent----- | | |
| 1947-63 | | |
| Temperate | 23.8 (corn) | 5.3 (cheese) |
| Tropical | 23.9 (rubber) | 4.9 (bananas) |
| 1954-63 | | |
| Temperate | 12.1 (barley) | 2.4 (wheat flour) |
| Tropical | 13.3 (rubber) | 3.1 (tea) |

For the Temperate Zone the greatest drop in the degree of fluctuation from the overall period to the recent period occurred for wheat flour (22.5 percent to 2.4 percent). The smallest drop occurred for butter (9.0 percent to 8.7 percent). For the Tropical Zone, the greatest drop occurred for coffee (19.5 percent to 5.0 percent); the least for bananas (4.9 percent to 3.5 percent). The degree of fluctuation for sugar averaged slightly higher in the more recent period than for the whole period. This is the only case of an increase in fluctuation.

TABLE 5.--Deviations around the trends in export earnings of Free World agricultural exports, major commodities, 1954-63 and 1947-63

| Commodity | Average deviation from-- | | Average deviation as a percentage of average export earnings | |
|-------------------------------------|-------------------------------|-----------------------------------|--------------------------------------------------------------------|-------------------------------|
| | 10-year trend (1954-63) | 17-year trend (1947-63) | 10-year trend (1954-63) | 17-year trend (1947-63) |
| <u>Temperate Zone Commodities</u> | | <u>---Million U.S. dollars---</u> | | <u>Percent</u> |
| Wheat..... | 170.9 | 255.8 | 9.9 | 15.3 |
| Wheat flour..... | 7.3 | 83.7 | 2.4 | 22.5 |
| Barley..... | 36.6 | 48.7 | 12.1 | 17.5 |
| Corn..... | 63.2 | 108.5 | 12.0 | 23.8 |
| Bacon, ham, salted pork..... | 7.1 | 12.5 | 3.0 | 6.1 |
| Powdered milk..... | 9.3 | 14.6 | 6.4 | 11.4 |
| Butter..... | 36.4 | 36.6 | 8.7 | 9.0 |
| Cheese..... | 9.9 | 14.3 | 3.3 | 5.3 |
| Eggs (in the shell)..... | 12.5 | 23.8 | 5.7 | 12.3 |
| Soybeans..... | 18.5 | 25.6 | 6.5 | 13.0 |
| Wool (greasy)..... | 101.9 | 199.0 | 7.4 | 15.1 |
| Weighted average ¹ | --- | --- | 8.1 | 14.9 |
| <u>Tropical Zone Commodities</u> | | | | |
| Rice (milled)..... | 38.0 | 75.3 | 6.2 | 12.2 |
| Bananas..... | 11.2 | 14.1 | 3.5 | 4.9 |
| Copra..... | 14.1 | 25.7 | 5.8 | 10.2 |
| Peanuts (shelled)..... | 16.2 | 23.6 | 7.6 | 12.6 |
| Palm oil..... | 6.3 | 11.6 | 5.4 | 10.2 |
| Coffee..... | 104.0 | 369.0 | 5.0 | 19.5 |
| Tea..... | 19.1 | 41.7 | 3.1 | 7.7 |
| Cocoa..... | 48.8 | 64.4 | 9.3 | 13.6 |
| Sugar (raw)..... | 105.7 | 88.6 | 9.0 | 8.4 |
| Rubber (natural)..... | 162.3 | 267.4 | 13.3 | 23.9 |
| Jute..... | 16.8 | 35.4 | 9.1 | 18.0 |
| Weighted average ¹ | --- | --- | 7.7 | 15.3 |

¹ Weighted by estimated average value, 1959-62.

INFLUENCE OF PRICE CHANGES ON EXPORT EARNINGS

Export earnings are determined in part by prices and in part by the physical quantities sold. In a static situation, it follows that if prices fall and total revenue increases (export earnings in this study) then the demand function with regard to price is elastic; if prices fall and export earnings fall, demand is inelastic. This assumes that income, population, and taste remain constant. Over a period of years these factors are not likely to remain constant. Therefore, the data in this report on prices and export earnings cannot be used to determine price elasticity unless adjustments are made for changes in the other factors.

Supply of many agricultural commodities entering world trade is determined by internal prices established and supported by the respective governments. In line with domestic policies, these prices are often above world market prices. In addition, international commodity agreements are presently in operation for wheat, sugar, coffee, and cocoa. Production in these cases is only indirectly influenced by world prices.

Trend Analysis

Although prices for approximately four-fifths of the major commodities in this study showed a declining trend during the postwar period, export earnings either showed little change or showed an upward trend. For most commodities, the quantity exported increased during this period sufficiently to offset price declines. Notable exceptions to this are the declines in revenue for coffee and cocoa since 1954. Even if measured in current dollars, exports of these two commodities did not increase sufficiently to overcome the decline in their prices. (See fig. 1.) For the same reason, earnings of eggs and palm oil declined to some extent in 1954-63 and those of copra and jute in 1947-63. For the major tropical products, quantities exported increased sufficiently to hold export earnings on a level trend in terms of current dollars during 1954-63 in spite of declining prices. (See fig. 4.) Over the entire postwar period prices declined slightly but earnings increased by approximately 2.4 percent.

For the Temperate Zone, prices declined 1.5 percent during 1954-63 and 2.0 percent during 1947-63, yet earnings in the two periods increased 4.7 percent and 3.4 percent (See fig. 4.) This indicates that for the Temperate Zone commodities, in general, declining prices were more than offset by increases in the quantities exported. Increased grain shipments from the highly developed to the less developed nations are no doubt partly responsible for the increased exports.

For individual commodities the data for soybeans and corn present interesting cases. Over the entire postwar period prices declined 2.2 percent for soybeans. Nevertheless, computations for this study show that earnings increased nearly 14 percent. The figures for corn are almost as dramatic as those for soybeans. (See fig. 1.) The large growth in soybean and corn exports has been due to increased imports by Japan, West Germany, the Netherlands, and other highly developed nations.

As stated above, the increased shipments of Temperate Zone commodities might be due to P.L. 480 shipments. However, available evidence indicates that these shipments have remained at a fairly constant percentage of total world shipments of food and fiber.

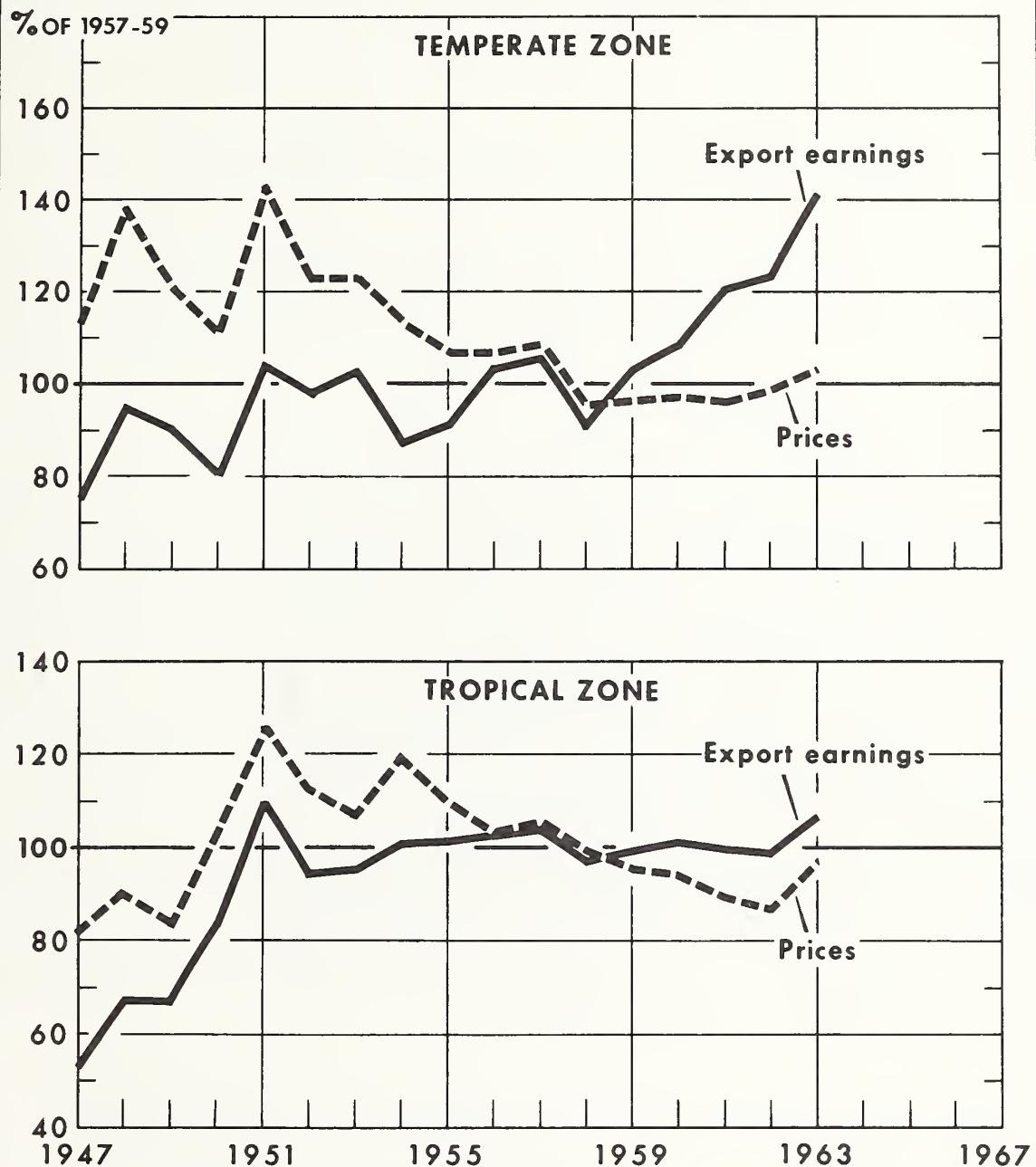
Fluctuation Analysis

The data developed to measure fluctuations in prices (table 3) and export earnings (table 5) indicate that for the tropical commodities the influence of price fluctuations on export earnings has been mitigated by the changes in quantities exported. The influence of these changes, however, has not been very great. On the average during the last 10 years prices varied from the trend about 9 percent and earnings about 8 percent. During the entire postwar period prices fluctuated on the average 17.6 percent and earnings only 1.5 percentage points less. For some commodities, such as cocoa, the changes in quantity reduced the impact of price fluctuation upon earnings, but apparently this did not hold true for peanuts and certain other commodities.

SOME IMPLICATIONS FOR LESS DEVELOPED NATIONS

The rapid increase in sales of soybeans and corn to the high-income markets of Europe and Japan was the result of a growing demand for feed components for expanding livestock industries, primarily poultry and swine. The increase in the quantity of meat demanded was the result of lower prices and of increased incomes and populations in the highly developed nations, together with intensive market promotion by the U.S. livestock feed industry and the Department of Agriculture.

PRICES AND EXPORT EARNINGS OF MAJOR AGRICULTURAL EXPORTS, BY CLIMATIC ZONE



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Figure 4

It is difficult to measure the relative importance of the various causes. Without doubt there was an interdependence among them. High incomes probably inspired market promotion schemes. Together, these two factors led to an increase in the amount of meat demanded, and indirectly to an increase in the quantity of soybeans and corn demanded. Increased demand led to mass production and more efficient distribution systems, resulting in lower per unit costs and lower prices. Lower prices, in turn, led to greater quantities demanded and to a greater production capacity. With a larger capacity to produce, marketing promotional effort became more important. Increased marketing efforts led to a greater demand--and so forth.

Capacity to increase production of soybeans was brought about in the United States by a shift from production of a number of other agricultural commodities. Production of these other commodities, at prices generally considered reasonable, was greater than domestic and international demand.

To the extent possible, nations not earning sufficient foreign exchange for economic development should follow this example and shift production to those agricultural commodities, manufactured goods, or services for which there is a growing effective demand. This is difficult for many less developed nations, because (1) the people in these nations are generally untrained in technical skills and the illiteracy rate is often high, (2) geographic areas are politically fragmented, and (3) the infrastructure is not sufficiently developed to support industrialization.

Technical skills can be developed over a period of time, however. Natural resources can be developed also but a certain minimum diversity of natural resources is necessary before an area can survive as an independent economic and political entity in today's world. To be economically viable a nation must be able to exploit different resources as prices change. National boundaries today often enclose areas in which only a few agricultural commodities can be presently produced on a mass basis and sold in the world market. Shifting to manufacturing will help, but this is usually a long process. Such a shift also requires a certain minimum size of market; that is, a minimum area over which goods and services can flow unimpeded. Numerous problems have been caused by the fragmentation of geographic areas into small political units.

To the extent that people are untrained and geographic areas are fragmented, less developed nations have little ability to develop new resources. One viewpoint is that their chief problem is this inability and not low prices for their commodities. Low prices are the result of the problem and not the cause.

The opposite viewpoint might also be taken. Before these nations can effectively and efficiently shift the allocation of resources, certain manmade facilities must exist, such as transportation and communications systems. These items generally are not present and cannot be built, partly because of the shortage of capital in the form of foreign exchange. The shortage of foreign exchange is to a large extent due to the low prices received for exports. From this viewpoint low prices become the cause of a nation's problems and not the result. Thus, low or declining prices are both the cause and the effect of the problems of the less developed nations.

As such, international efforts to control prices through commodity agreements cannot solve certain basic problems. It does not follow that the problems of illiteracy and geographic fragmentation will disappear once a higher price has been received for exports. Commodity agreements can usefully supplement certain remedies, but they can never substitute for them.

The argument for commodity agreements is probably stronger if they are instituted for the purpose of reducing fluctuations in prices and earnings. Extremely high prices induce the producing nations to invest in resources which will have to be shifted, at great cost and trouble, at some future time when an oversupply forces prices to an extremely low point. In addition, optimistic plans by the less developed nations based upon high prices, or expectations of high prices (and assuming high foreign exchange earnings), may have to be scaled downward when prices drop suddenly, or else borrowing at high rates of interest may become necessary to continue projects already underway. Similarly, plans

made when prices are low may be drawn at levels below a nation's long-term ability to import; once prices increase, plans may need to be redrawn. These nations can little afford an incident which adds to the instability of their developing economies and detracts from their efficiency.

CONCLUSIONS

A number of basic conclusions can be drawn from the statistical measures developed for this report. First, prices of the major Tropical Zone commodities declined significantly more than the major Temperate Zone commodities during 1954-63. Over the entire postwar period, however, the situation is reversed. Prices for the Temperate Zone commodities declined generally at roughly 2 percent a year while prices for the Tropical Zone commodities did not show much of a downward trend. As to fluctuations, prices for tropical commodities in both time periods deviated considerably more around the trend lines than prices for Temperate Zone commodities. Fluctuations for tropical commodities were greater by 60 percent over the entire postwar period and 80 percent over the last 10 years of this study.

Although prices declined for both groups of commodities in both time periods, export earnings increased for both groups in both time periods. For the Tropical Zone commodities the increase in earnings was 2.5 percent for the entire postwar period, but the increase was negligible over the last decade. Significant declines in earnings for coffee and cocoa largely offset increases for a number of other Tropical Zone commodities during the latter period. Export earnings of the Temperate Zone commodities increased in both periods in spite of rather substantial declines in prices. Fluctuations of export earnings showed little difference between the two areas. For 1954-63, fluctuations in earnings were only half as great as they were for the entire postwar period.

For the most part, export earnings have been increasing although prices have been declining. This is possible only because the quantities exported have increased. Increases in quantities in relation to price declines have been greater for the Temperate Zone commodities than for the Tropical Zone commodities.

The changes in the prices and earnings of soybeans and corn lead to some interesting observations. Several highly developed nations increased their export earnings by shifting some of their resources to the production of soybeans and corn, in spite of declining prices for these two commodities. In light of a number of problems, less developed nations are unable to shift production readily from one export item to another.

APPENDIX

TABLE 6.--Exports of 22 major agricultural commodities: Percentage of world trade from leading suppliers, and percentage of total exports of selected countries, 1959-62 average

| Commodity and country | Percent of world trade | Percent of country's total exports |
|--------------------------|------------------------|------------------------------------|
| <u>Temperate Zone</u> | | |
| Wheat: | | |
| United States..... | 46.0 | 4.5 |
| Canada..... | 28.0 | 9.0 |
| Australia..... | 10.5 | 9.0 |
| Wheat flour: | | |
| United States..... | 37.0 | .5 |
| Canada..... | 19.5 | 1.0 |
| Australia..... | 12.0 | 2.0 |
| Germany..... | 11.0 | .5 |
| Barley: | | |
| United States..... | 33.5 | .5 |
| France..... | 15.0 | 1.0 |
| Corn: | | |
| United States..... | 58.0 | 2.0 |
| Argentina..... | 18.0 | 10.5 |
| Bacon, ham, salted pork: | | |
| Denmark..... | 74.0 | 12.5 |
| Powdered milk: | | |
| United States..... | 23.5 | --- |
| Netherlands..... | 17.0 | 1.0 |
| Denmark..... | 11.0 | 1.0 |
| Butter: | | |
| New Zealand..... | 31.5 | 16.0 |
| Denmark..... | 23.5 | 6.5 |
| Australia..... | 13.0 | 2.5 |
| Cheese: | | |
| Netherlands..... | 19.5 | 1.5 |
| New Zealand..... | 16.5 | 7.0 |
| Denmark..... | 14.5 | 3.0 |
| Switzerland..... | 11.0 | 2.0 |
| France..... | 10.0 | .5 |
| Eggs: | | |
| Netherlands..... | 46.0 | 2.5 |
| Denmark..... | 19.0 | 2.5 |

See footnotes at end of table.

TABLE 6.--Exports of 22 major agricultural commodities: Percentage of world trade from leading suppliers, and percentage of total exports of selected countries, 1959-62 average--Continued

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| Commodity and country | Percent of world trade | Percent of country's total exports |
|-----------------------------------|------------------------|------------------------------------|
| <u>Temperate Zone (Continued)</u> | | |
| Soybeans: | | |
| United States..... | 96.0 | 1.5 |
| Wool: | | |
| Australia..... | 47.0 | 35.0 |
| New Zealand..... | 17.0 | 33.5 |
| Uruguay..... | ¹ 3.5 | 39.5 |
| <u>Tropical Zone</u> | | |
| Rice: | | |
| Burma..... | 25.5 | 67.5 |
| Thailand..... | 25.0 | 36.5 |
| United States..... | 20.0 | .5 |
| Viet Nam..... | 3.0 | 25.5 |
| Bananas: | | |
| Ecuador..... | 27.5 | 62.0 |
| Honduras..... | 11.0 | 47.5 |
| Costa Rica..... | 7.0 | 25.5 |
| Panama..... | 6.0 | 52.0 |
| Martinique..... | 4.5 | 44.5 |
| Somalia..... | 3.5 | 45.5 |
| Copra: | | |
| Philippines..... | 50.0 | 22.5 |
| Indonesia..... | 10.5 | 3.0 |
| Peanuts: | | |
| Nigeria..... | 37.0 | 17.0 |
| Senegal..... | 22.0 | ¹ 39.0 |
| Niger..... | ¹ 4.0 | 65.0 |
| Palm oil: | | |
| Nigeria..... | 31.5 | 7.5 |
| Malaysia..... | 18.0 | 2.5 |
| Coffee: | | |
| Brazil..... | 37.0 | 54.5 |
| Colombia..... | 17.5 | 72.0 |
| Ivory Coast..... | 4.0 | 44.0 |
| El Salvador..... | 4.0 | 60.5 |
| Guatemala..... | 3.5 | 62.0 |
| Angola..... | 2.5 | 38.5 |
| Uganda..... | 2.5 | 40.5 |
| Costa Rica..... | 2.5 | 52.0 |

See footnotes at end of table.

TABLE 6.--Exports of 22 major agricultural commodities: Percentage of world trade from leading suppliers, and percentage of total exports of selected countries, 1959-62 average--Continued

| Commodity and country | Percent of world trade | Percent of country's total exports |
|----------------------------------|------------------------|------------------------------------|
| <u>Tropical Zone (Continued)</u> | | |
| Coffee (Continued) | | |
| Ethiopia..... | 2.0 | 53.5 |
| Kenya..... | 1.5 | 25.5 |
| Haiti..... | 1.0 | 52.0 |
| Nicaragua..... | 1.0 | 25.0 |
| Togo..... | 0.5 | 31.0 |
| Cocoa: | | |
| Ghana..... | 37.5 | 65.5 |
| Nigeria..... | 19.5 | 21.0 |
| Cameroon..... | 6.0 | 30.0 |
| Togo..... | 1.0 | 32.5 |
| Tea: | | |
| India..... | 42.5 | 19.0 |
| Ceylon..... | 37.5 | 62.0 |
| Sugar: | | |
| Cuba..... | 43.0 | ¹ 65.5 |
| Philippines..... | 10.0 | 23.5 |
| Dominican Republic..... | ¹ 5.0 | 49.5 |
| Mauritius..... | ¹ 4.0 | 86.5 |
| China (Taiwan)..... | ¹ 2.5 | 32.5 |
| Reunion..... | 2.0 | 80.0 |
| Guadeloupe..... | 1.5 | 54.0 |
| Martinique..... | ¹ 1.0 | 30.5 |
| Rubber: | | |
| Malaysia..... | 51.0 | 90.0 |
| Indonesia..... | 22.5 | 43.0 |
| Thailand..... | 7.0 | 25.5 |
| Viet Nam..... | 3.0 | 61.0 |
| Liberia..... | 2.0 | 43.0 |
| Jute: | | |
| Pakistan..... | 86.5 | 44.0 |

¹ Partially estimated or different base period used.

NOTE: Leading suppliers are defined as nations exporting 10 percent or more of world trade. Nations were also selected for inclusion if 25 percent or more of total foreign exchange earnings were derived from any one of the 22 major commodities included in this study.

Source of basic data: (1) International Monetary Fund, International Financial Statistics, various issues, and records; (2) Food and Agriculture Organization of the United Nations, Trade Yearbook, Vol. 17, Rome, Italy, 1964.

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